NOTICE OF REVISION (NOR) (See MIL-STD-480 for instructions) This revision described below has been authorized for the document listed.	DATE (YYMMDD) 92-10-05	Form Approved OMB No. 0704-0188

Public reporting burden for this collection is estimated to average 1 hour per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to Washington Headquarters Services, Directorate for Information Operations and Reports, 1215 Jefferson Davis Highway, Suite 1204, Arlington, VA 22202-4302, and to the Office of Information and Regulatory Affairs, Office of Management and Budget, Washington, DC 20503.

1. ORIGINATOR NAME AND ADDRESS Defense Electronics Supply Center Dayton, Ohio 45444-5270	2. CAGE CODE 67268	3. NOR NO. 5962-R335-92
	4. CAGE CODE 67268	5. DOCUMENT NO. 84079
6. TITLE OF DOCUMENT MICROCIRCUIT, DIGITAL, BIPOLAR, ADVANCED LOW-POWER SCHOTTKY TTL, DECADE COUNTER, MONOLITHIC SILICON	7. REVISION LETTER (Current) C	(New) D
	8. ECP NO. 84079ECP-1	

9. CONFIGURATION ITEM (OR SYSTEM) TO WHICH ECP APPLIES

All

10. DESCRIPTION OF REVISION

Sheet 1: Revisions ltr column; add "D".
Revisions description column; add "Changes in accordance with NOR 5962-R335-92".
Revisions date column; add "92-10-05".
Revision level block; change from "B" to "D".
Rev status of sheets; for sheet 4, change from "B" to "D".

Sheet 4: Table I, output current, I_O; change minimum limit from "-30 mA" to "-20 mA".
Revision level block; change from "B" to "D".

11. THIS SECTION FOR GOVERNMENT USE ONLY

a. CHECK ONE

[X] EXISTING DOCUMENT SUPPLEMENTED BY THIS NOR MAY BE USED IN MANUFACTURE.

[ ] REVISED DOCUMENT MUST BE RECEIVED BEFORE MANUFACTURER MAY INCORPORATE THIS CHANGE.

[ ] CUSTODIAN OF MASTER DOCUMENT SHALL MAKE ABOVE REVISION AND FURNISH REVISED DOCUMENT TO:

b. ACTIVITY AUTHORIZED TO APPROVE CHANGE FOR GOVERNMENT DESC-ECC	SIGNATURE AND TITLE Monica L. Poelking Chief, Custom Microelectronics	DATE (YYMMDD) 92-10-05
12. ACTIVITY ACCOMPLISHING REVISION DESC-ECC	REVISION COMPLETED (Signature) Thanh V. Nguyen	DATE (YYMMDD) 92-10-05

NOTICE OF REVISION (NOR) (See MIL-STD-480 for instructions) This revision described below has been authorized for the document listed.	DATE (YYMMDD) 92-02-20	Form Approved OMB No. 0704-0188

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1. ORIGINATOR NAME AND ADDRESS Defense Electronics Supply Center Dayton, Ohio 45444-5277	2. CAGE CODE 67268	3. NOR NO. 5962-R133-92
	4. CAGE CODE 67268	5. DOCUMENT NO. 84079
6. TITLE OF DOCUMENT Microcircuits, Digital, Bipolar, Advanced Low Power Schottky, TTL, Decade Counter ,Monolithic Silicon	7. REVISION LETTER (Current) B	(New) C
	8. ECP NO. N/A (Authorized in the past)	

9. CONFIGURATION ITEM (OR SYSTEM) TO WHICH ECP APPLIES

All

10. DESCRIPTION OF REVISION

Sheet 1: Revisions ltr column; add "C"
Revisions description column; add "Changes in accordance with NOR 5962-R133-92".
Revisions date column; add "92-02-20".

Sheet 3: Para 1.4 Recommended operating conditions;
Change Minimum synchronous clear setup time (inactive) from 10 ns to 20 ns.

Sheet 4: Table I; I_O
Change from "Q output" to "All" under test condition column.
Delete RCO/CCO output under test condition column and minimum (-15 mA) and maximum (-70 mA) limit.

11. THIS SECTION FOR GOVERNMENT USE ONLY

a. CHECK ONE

[X] EXISTING DOCUMENT SUPPLEMENTED BY THIS NOR MAY BE USED IN MANUFACTURE.

[ ] REVISED DOCUMENT MUST BE RECEIVED BEFORE MANUFACTURER MAY INCORPORATE THIS CHANGE.

[ ] CUSTODIAN OF MASTER DOCUMENT SHALL MAKE ABOVE REVISION AND FURNISH REVISED DOCUMENT TO:

b. ACTIVITY AUTHORIZED TO APPROVE CHANGE FOR GOVERNMENT DESC-ECC	SIGNATURE AND TITLE Monica L. Poelking Chief, Custom Microelectronics	DATE (YYMMDD) 92-02-20
12. ACTIVITY ACCOMPLISHING REVISION DESC-ECC	REVISION COMPLETED (Signature) Tim Noh	DATE (YYMMDD) 92-02-20

REVISIONS			
LTR	DESCRIPTION	DATE (YR-MO-DA)	APPROVED
A	Convert to military drawing format. Change VIL, fMAX, tP, CLOCK, IIL, and propagation delays. Remove vendor, CAGE 04713.	2 Sept 1986	N. A. Hauck
B	Change fanout, synchronous clear pulse width, enable P/enable T setup time, and I_{CC}. Editorial changes.	29 May 1987	N. A. Hauck

REV																			
SHEET																			
REV																			
SHEET																			

REV STATUS OF SHEETS																
REV	B	B	B	B	B	B	A	A	A	B						
SHEET	1	2	3	4	5	6	7	8	9	10						

PMIC N/A

MILITARY DRAWING

THIS DRAWING IS AVAILABLE FOR USE BY ALL DEPARTMENTS AND AGENCIES OF THE DEPARTMENT OF DEFENSE

AMSC N/A

PREPARED BY
David W. Queenan

CHECKED BY
D.A. DiCenzo

APPROVED BY
N.A. Hauch

DRAWING APPROVAL DATE
31 July 1984

REVISION LEVEL
B

DEFENSE ELECTRONIC SUPPLY CENTER
DAYTON, OHIO

MICROCIRCUIT, DIGITAL, ADVANCED LOW POWER SCHOTTKY TTL, DECADE COUNTER, MONOLITHIC SILICON

SIZE	CAGE CODE	
A	**67268**	**84079**

SHEET 1 OF 10

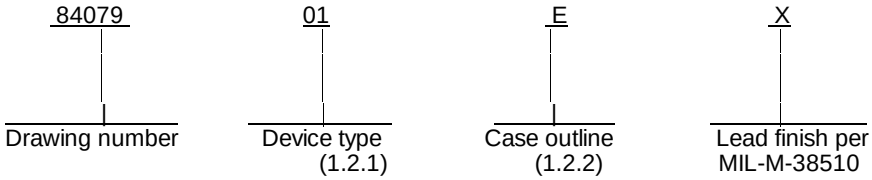
DESC FORM 193
JUL 94

5962-E234-4

1. SCOPE

1.1 Scope. This drawing describes device requirements for class B microcircuits in accordance with 1.2.1 of MIL-STD-883, "Provisions for the use of MIL-STD-883 in conjunction with compliant non-JAN devices".

1.2 Part number. The complete part number shall be as shown in the following example:



1.2.1 Device type. The device type shall identify the circuit function as follows:

Device type	Generic number	Circuit function
01	54ALS162	Synchronous 4-bit decade counter with synchronous clear

1.2.2 Case outlines. The case outlines shall be as designated in appendix C of MIL-M-38510, and as follows:

Outline letter	Case outline
E	D-2 (16-lead, 1/4" x 7/8"), dual-in-line package
F	F-5 (16-lead, 1/4" x 3/8"), flat package
2	C-2 (20-terminal, .350" x .350"), square chip carrier package

1.3 Absolute maximum ratings.

Supply voltage range	-0.5 V dc to +7.0 V dc
Input voltage range	-1.5 V dc at -18 mA to +7.0 V dc
Storage temperature range	-65°C to +150°C
Maximum power dissipation (P_D) 1/	115 mW
Lead temperature (soldering, 10 seconds)	+300°C
Thermal resistance, junction-to-case (O_{JC}):	
Case E	50°C/W
Case F	70°C/W
Case 2	60°C/W
Junction temperature (T_J)	+175°C

1.4 Recommended operating conditions.

Maximum low level output current (I_{OL})	4.0 mA
Supply voltage (V_{CC})	4.5 V dc minimum to 5.5 V dc maximum
Minimum high level input voltage (V_{IH})	2.0 V dc
Maximum low level input voltage (V_{IL})	0.7 V dc
Normalized fanout (each output):	
Low level	20 maximum
High level	10 maximum
Input clock frequency (f_{MAX})	22 MHz
Minimum width of clock pulse (t_p clock)	20 ns

1/ Must withstand the added P_D due to short circuit test (e.g., I_O).

Minimum setup times before clock :
DATA . . . . . 20 ns
Minimum synchronous clear setup time:
(Low) . . . . . 20 ns
(Inactive) . . . . . 10 ns
Minimum enable P/enable T setup time: . . . . . 30 ns
Hold times (t_{HOLD}) . . . . . 0 ns
Case operating temperature range (T_C) . . . . . -55°C to +125°C

2. APPLICABLE DOCUMENTS

2.1 Government specification and standard. Unless otherwise specified, the following specification and standard, of the issue listed in that issue of the Department of Defense Index of Specifications and Standards specified in the solicitation, form a part of this drawing to the extent specified herein.

SPECIFICATION

MILITARY

MIL-M-38510 - Microcircuits, General Specification for.

STANDARD

MILITARY

MIL-STD-883 - Test Methods and Procedures for Microelectronics.

(Copies of the specification and standard required by manufacturers in connection with specific acquisition functions should be obtained from the contracting activity or as directed by the contracting activity.)

2.2 Order of precedence. In the event of a conflict between the text of this drawing and the references cited herein, the text of this drawing shall take precedence.

3. REQUIREMENTS

3.1 Item requirements. The individual item requirements shall be in accordance with 1.2.1 of MIL-STD-883, "Provisions for the use of MIL-STD-883 in conjunction with compliant non-JAN devices" and as specified herein.

3.2 Design, construction, and physical dimensions. The design, construction, and physical dimensions shall be as specified in MIL-M-38510 and herein.

3.2.1 Terminal connections. The terminal connections shall be as specified on figure 1.

3.2.2 Logic diagram. The logic diagram shall be as specified on figure 2.

3.2.3 Truth table. The truth table shall be as specified on figure 3.

3.2.4 Case outlines. The case outlines shall be in accordance with 1.2.2 herein.

3.3 Electrical performance characteristics. Unless otherwise specified, the electrical performance characteristics are as specified in table I and apply over the full recommended case operating temperature range.

3.4 Marking. Marking shall be in accordance with MIL-STD-883 (see 3.1 herein). The part shall be marked with the part number listed in 1.2 herein. In addition, the manufacturer's part number may also be marked as listed in 6.4 herein.

TABLE I. Electrical performance characteristics.

Test	Symbol	Conditions $-55°C \le T_C \le +125°C$ unless otherwise specified		Group A subgroups	Limits		Unit
					Min	Max	
High level output voltage	V_{OH}	V_{CC} = 4.5 V, IOH = -400 µA, V_{IN} = 0.7 V or 2.0 V		1,2,3	2.5		V
Low level output voltage	V_{OL}	V_{CC} = 4.5 V, IOL = 4 mA, V_{IN} = 0.7 V or 2.0 V		1,2,3		0.4	V
Input clamp voltage	V_{IC}	V_{CC} = 4.5 V, T_C = +25°C, V_{IN} = -18 mA		1		-1.5	V
Low level input current	I_{IL}	V_{CC} = 5.5 V, V_{IN} = 0.4 mA		1,2,3		-200	µA
High level input current	I_{IH1}	V_{CC} = 5.5 V, V_{IN} = 2.7 V	$\overline{LOAD}$, CLK or ENT	1,2,3		40	µA
			All other inputs	1,2,3		20	µA
	I_{IH2}	V_{CC} = 5.5 V, V_{IN} = 7.0 V	$\overline{LOAD}$, CLK or ENT	1,2,3		200	µA
			All other inputs	1,2,3		100	µA
Short circuit output current	I_O	V_{CC} = 5.5 V, V_{IN} = 2.25 V 1/	Q outputs	1,2,3	-30	-112	mA
			RCO/CCO outputs	1,2,3	-15	-70	mA
Supply current	I_{CC}	V_{CC} = 5.5 V		1,2,3		25	mA
Maximum input A, clock, or count up frequency	f_{MAX}	VCC = 5.0 V, CL = 50 pF, ±10% RL = 500Ω, ±5%		9,10, 11	22		MHz
Propagation delay time, CLK to Q	t_{PLH1}			9,10, 11		22	ns
	t_{PHL1}			9,10, 11		28	ns

See footnote at end of table.

TABLE I. Electrical performance characteristics - Continued.

Test	Symbol	Conditions $-55^{\circ}C \leq T_C \leq +125^{\circ}C$ unless otherwise specified	Group A subgroups	Limits		Unit
				Min	Max	
Propagation delay time, CLK to RCO	t_{PLH2}	VCC = 5.0 V, CL = 50 pF, ±10% RL = 500Ω, ±5%	9,10 11		34	ns
	t_{PHL2}		9,10, 11		27	ns
Propagation delay time, ENT to RCO	t_{PLH3}		9,10 11		20	ns
	t_{PHL3}		9,10, 11		16	ns

1/ The output conditions have been chosen to produce a current that closely approximates one-half of the true short-circuit output current, I_{OS}.

3.5 Certificate of compliance. A certificate of compliance shall be required from a manufacturer in order to be listed as an approved source of supply in 6.4. The certificate of compliance submitted to DESC-ECS prior to listing as an approved source of supply shall state that the manufacturer's product meets the requirements of MIL-STD-883 (see 3.1 herein) and the requirements herein.

3.6 Certificate of conformance. A certificate of conformance as required in MIL-STD-883 (see 3.1 herein) shall be provided with each lot of microcircuits delivered to this drawing.

3.7 Notification of change. Notification of change to DESC-ECS shall be required in accordance with MIL-STD-883 (see 3.1 herein).

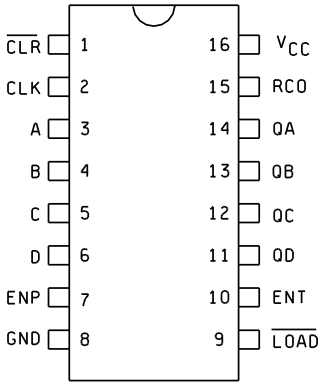
3.8 Verification and review. DESC, DESC's agent, and the acquiring activity retain the option to review the manufacturer's facility and applicable required documentation. Offshore documentation shall be made available onshore at the option of the reviewer.

4. QUALITY ASSURANCE PROVISIONS

4.1 Sampling and inspection. Sampling and inspection procedures shall be in accordance with section 4 of MIL-M-38510 to the extent specified in MIL-STD-883 (see 3.1 herein).

4.2 Screening. Screening shall be in accordance with method 5004 of MIL-STD-883, and shall be conducted on all devices prior to quality conformance inspection. The following additional criteria shall apply:

CASES E AND F



CASE 2

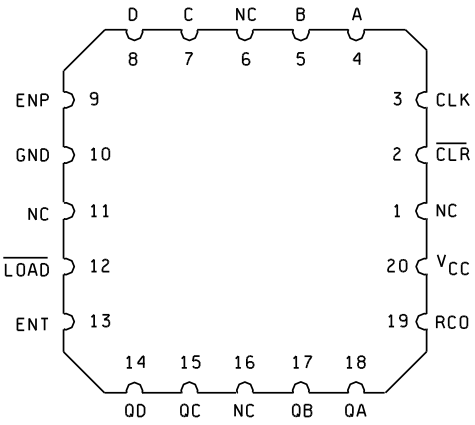


FIGURE 1. Terminal connections (top view).

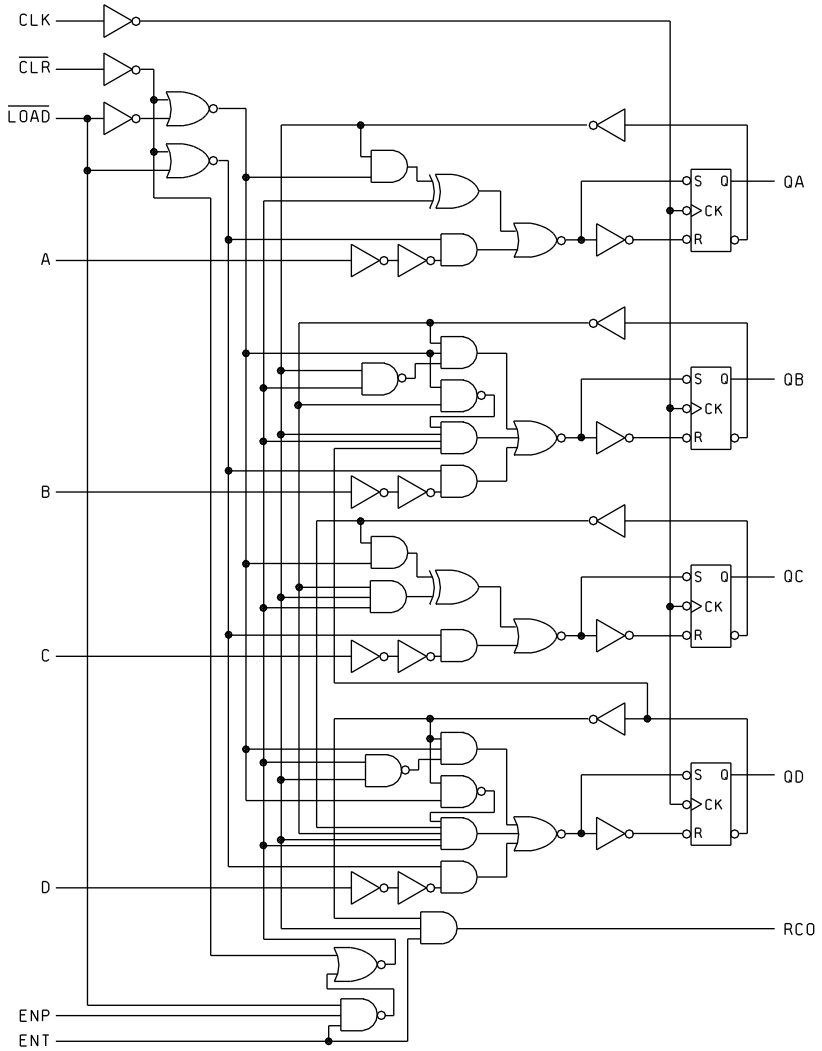


FIGURE 2. Logic diagram.

Inputs at time t_n									Outputs at time t_{n+1}				
Clock	Enable P	Enable T	$\overline{Load}$	A	B	C	D	$\overline{Clear}$	Q_A	Q_B	Q_C	Q_D	Carry output
CP	L	X	H	X	X	X	X	H	NC	NC	NC	NC	NC
CP	X	L	H	X	X	X	X	H	NC	NC	NC	NC	L
CP	H	H	H	X	X	X	X	H	Previous count plus 1				H if count = 9, L if count < 9
CP	X	H	L	X	X	X	X	H	A	B	C	D	H if count = 9, L if count < 9
CP	X	L	L	X	X	X	X	H	A	B	C	D	L
CP	X	X	X	X	X	X	X	L	L	L	L	L	L

L = low level voltage
H = high level voltage
x = irrelevant
CP = clock pulse
NC = no change

FIGURE 3. Truth table.

a. Burn-in test (method 1015 of MIL-STD-883).

(1) Test condition A, B, C, or D using the circuit submitted with the certificate of compliance (see 3.5 herein).

(2) T_A = +125°C, minimum.

b. Interim and final electrical test parameters shall be as specified in table II herein, except interim electrical parameter tests prior to burn-in are optional at the discretion of the manufacturer.

4.3 Quality conformance inspection. Quality conformance inspection shall be in accordance with method 5005 of MIL-STD-883 including groups A, B, C, and D inspections. The following additional criteria shall apply.

4.3.1 Group A inspection.

a. Tests shall be as specified in table II herein.

b. Subgroups 4, 5, 6, and 8 in table I, method 5005 of MIL-STD-883 shall be omitted.

c. Subgroup 7 tests shall verify the truth table.

4.3.2 Groups C and D inspections.

a. End-point electrical parameters shall be as specified in table II herein.

b. Steady-state life test (method 1005 of MIL-STD-883) conditions:

(1) Test condition A, B, C, or D using the circuit submitted with the certificate of compliance (see 3.5 herein).

(2) T_A = +125°C, minimum.

(3) Test duration: 1,000 hours, except as permitted by appendix B of MIL-M-38510 and method 1005 of MIL-STD-883.

TABLE II. Electrical test requirements.

MIL-STD-883 test requirements	Subgroups (per method 5005, table I)
Interim electrical parameters (method 5004)	---
Final electrical test parameters (method 5004)	1*,2,3,9
Group A test requirements (method 5005)	1,2,3,7,9, 10,11**
Groups C and D end-point electrical parameters (method 5005)	1,2,3

* PDA applies to subgroup 1.
**Subgroups 10 and 11, if not tested, shall be guaranteed to the specified limits in table I.

5. PACKAGING

5.1 Packaging requirements. The requirements for packaging shall be in accordance with MIL-M-38510.

6. NOTES

6.1 Intended use. Microcircuits conforming to this drawing are intended for use when military specifications do not exist and qualified military devices that will perform the required function are not available for OEM application. When a military specification exists and the product covered by this drawing has been qualified for listing on QPL-38510, the device specified herein will be inactivated and will not be used for new design. The QPL-38510 product shall be the preferred item for all applications.

6.2 Replaceability. Replaceability is determined as follows:

a. Microcircuits covered by this drawing will replace the same generic device covered by a contractor-prepared specification or drawing.

b. When a QPL source is established, the part numbered device specified in this drawing will be replaced by the microcircuit identified as part number M38510/38102B--.

6.3 Comments. Comments on this drawing should be directed to DESC-ECS, Dayton, Ohio 45444, or telephone 513-296-5375.

6.4 Approved source of supply. An approved source of supply is listed herein. Additional sources will be added as they become available. The vendor listed herein has agreed to this drawing and a certificate of compliance (see 3.5) has been submitted to DESC-ECS.

Military drawing part number	Vendor CAGE number	Vendor similar part number 1/	Replacement military specification part number
8407901EX	01295	SNJ54ALS162AJ	M38510/38102BEX
8407901FX	01295	SNJ54ALS162AW	M38510/38102BFX
84079012X	01295	SNJ54ALS162AFK	M38510/38102B2X

1/ Caution. Do not use this number for item acquisition. Items acquired to this number may not satisfy the performance requirements of this drawing.

Vendor CAGE number	Vendor name and address
01295	Texas Instruments, Incorporated P.O. Box 6448 Midland, TX 79701